**DO NOT LOSE THIS PACKET**

**Algebra 1 – Final Exam Study Guide Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Part 1: Vocabulary and Written Response**

* 1. What is a *function*?

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* 1. Describe a real-world situation that can be modeled by a function.

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* 1. What is a *solution* to an equation with only one variable?

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* 1. What is a *solution* to a *linear* equation?

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* 1. What is a *solution* to a *system of linear equations*?

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* 1. What is the difference between *simplifying an expression* and *solving an equation*?

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* 1. Label the **variable, coefficient, term, expression, base**, and **exponent.**
  2. Fill in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Defining Features** | **Equation** | **Graph** |
| **Linear Functions** |  |  |  |
| **Exponential Functions** |  |  |  |

**Part 2: Writing Equations**

**Linear Equations:**

* + 1. What is the slope-intercept form of a linear equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    2. What is the standard form of a linear equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    3. What makes two lines parallel to each other? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    4. What makes two lines perpendicular to each other? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    5. How do you calculate the slope/rate of change of a line when all you have is two points?

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* + 1. Write a slope-intercept form equation for a line that has a y-intercept of two and a slope of negative five.
    2. Write a slope-intercept form equation for the line that passes through (2, -3) and (5, 6).
    3. Write a slope-intercept form equation for the line that passes through (3, -2) and is parallel to the line:
    4. Write a slope-intercept form equation for the line that passes through (1, 8) and is perpendicular to the line:

**Exponential Equations:**

* + 1. What is the basic form of an exponential equation, and what do each of the variables represent?
    2. What makes an exponential equation one of exponential *growth* and what makes it an equation of exponential *decay*?
    3. Write an exponential equation in which the initial value is eight and the growth factor is three.
    4. Write an exponential equation for the following scenario:

*A population of rabbits has 1,250 male rabbits. The male rabbit population is doubling every month.*

*You have $10 in your bank account and it’s tripling every month.*

*The value of your music collection is $100 now but its value is being cut in half every year.*

**Part 3: Simplifying Expressions**

How can you tell when an expression is *completely* simplified?

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Simplify the following expressions *completely*:

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**Part 4: Solving Equations**

How can you check to see whether your solution to an equation is correct?

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How can you tell when an equation has “no solution”?

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How can you tell when an equation is really an “identity”?

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Solve the following equations. Check your work, and BOX your final answer.

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| 1) |
| 2) |
| 3) = 9 |
| 4) 12 |
| 5) |
| 6) |
| 7) |
| 8) |
| 9) |

**Part 5: Function Notation**

Use the graph of f(x) and the equation g(x) to find the following values.

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**Part 6: Graphing**

* + 1. How do you graph a linear equation when it is in slope-intercept form?

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* + 1. How do you graph a linear equation when it is in standard form?

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| --- |
| * + 1. Graph the following linear equations. You must NAME and EXTEND your lines.  1. B) C) D) 2. E) F)   C:\Users\John\Downloads\graph_20150516_220240.png |

|  |  |
| --- | --- |
| * + 1. Write the equation of the line shown in each graph. | |
| Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Equation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part 7: Systems of Linear Equations**

* + 1. What are the three main ways to solve a system of linear equations?

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
   * 1. How can a system of linear equations have *no solution?*

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* + 1. How can a system of linear equations have *one solution*?

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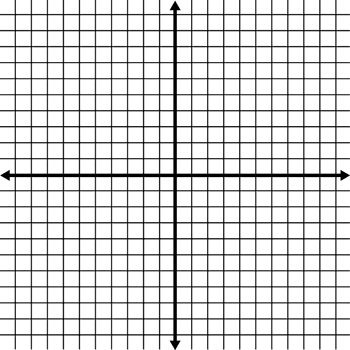
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* + 1. How can a system of linear equations have *infinite solutions*?

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* + 1. Solve the system by graphing.

* + 1. Solve the system using substitution.
    2. Solve the system using elimination.
    3. Solve the system using the method of your choice.

**Part 8: Exponential Simplification**

* + - 1. If an exponential expression is in its *simplest* form, what two things will it *NOT* have?

1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
   * + 1. Simplify the following exponential expressions so that they are in their simplest form.

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**Part 9: Writing and Naming Polynomials**

Complete the following chart with the correct polynomial names based on degree and on number of terms.

**Classifying Polynomials**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Degree | Name by Degree |  | Number of Terms | Name by Term |
| **0** |  |  | **0** |  |
| **1** |  |  | **1** |  |
| **2** |  |  | **2** |  |
| **3** |  |  | **3** |  |
| **4** |  |  | **4** |  |
| **5** |  |  | **5** |  |
| **6** |  |  | **6** |  |
| **7** |  |  | **7** |  |

Simplify each polynomial expression, then write it in standard form. Last, name each polynomial by term and by degree.

|  |
| --- |
| 4x2 - 3x3 standard form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| -10y + 1 standard form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 7x2 - 9x4 + 1 standard form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 9 + 2y2 standard form: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Part 10: Polynomial Operations**

Complete each operation. Write your answers in simplified, standard form.

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| --- |
| (w3 - 2 + w) + (-w - 2 - w3) |
| (-x4 + 5x3 + 6x - 1) + (2x3 - 6x2 - 9x + 1) |
| (-10y3 + 4y2 - 7y - 4) – (5y3 - 5y - 4y2 + 1) |
| 3g3(-5g2 - 1 + g) |
| (y + 3)(y - 6) |
| (6h2 + 4)(-h2 + 9) |

**Part 11: Factoring Polynomials**

What is the difference between *factoring* and distributing?

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How can you tell when you have factored a polynomial *completely*?

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Factor the following polynomials **completely.**

|  |
| --- |
| x2 + 9x + 20 |
| x2 – 7x – 8 |
| 2x2 +18x + 28 |
|  |
| 6x2 + 5x – 4 |